

Subperiosteal orbital abscess in chronic sinusitis - a case report

Ropień podokostnowy oczodołu w przebiegu przewlekłego zapalenia zatok przynosowych – opis przypadku.

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ABSTRACT:

Orbital abscess in the course of sinusitis are rare condition, but due to severe need urgent diagnosis and implementation of effective treatment. This complication due to the high variability of clinical symptoms qualifies this disease to a group of emergencies, mainly due to the risk of vision loss. We present a case report a patient with orbital subperiosteal abscess in chronic sinusitis, in which in the age of admission to an experienced significant disorders of the ocular. The patient was performed orbital abscess drainage by intranasal, complicated by the occurrence of orbital hematoma and the need to re-perform the surgery.

KEYWORDS:

orbital abscess, orbital phlegmon, intraorbital complications, sinusitis

STRESZCZENIE:

Ropnie oczodołu w przebiegu zapalenia zatok przynosowych są rzadkim schorzeniem, jednak ze względu na ciężki przebieg wymagają szybkiej diagnostyki i wdrożenia skutecznego leczenia. Ponieważ towarzyszy im duża zmienność objawów klinicznych, kwalifikuje się je do grupy stanów nagłych, głównie ze względu na zagrożenie utratą wzroku. W niniejszej pracy przedstawiamy opis przypadku pacjenta z ropniem podokostnowym oczodołu w przebiegu przewlekłego zapalenia zatok przynosowych, u którego w dobie przyjęcia na oddział występowały znaczne zaburzenia ze strony narządu wzroku. Wykonano u niego drenaż ropnia oczodołu drogą wewnątrznosową, powikłanego wystąpieniem krwiaka oczodołu, co spowodowało konieczność wykonania powtórnego zabiegu operacyjnego.

SŁOWA KLUCZOWE: ropień oczodołu, ropowica oczodołu, powikłania wewnątrzoczodołowe, zapalenie zatok przynosowych

INTRODUCTION

Bacterial inflammation of orbital tissues in the course of paranasal sinusitis belongs to a group of severe inflammations characterized by high dynamics of changes in clinical symptoms. Despite the fact that these inflammations are not a significant epidemiological problem, they require urgent diagnosis and quick implementation of effective treatment due to the possibility of severe complications. Orbital cellulitis is usually a result of inflammation being transmitted from paranasal sinuses. Most commonly, the complication affects ethmoid, although

it may also affect all groups of paranasal sinuses. Although the pediatric patients are mostly affected, the disorder may occur in patients at any age group [6, 5].

CASE REPORT

A male patient, aged 56, was admitted in emergency mode to the Otolaryngology Clinic due to disturbed vision in the left eye, intensifying for 48 hours, with intensifying left eye exophthalmus and eyelid swelling. The patient had

undergone endoscopic surgery of the nose and paranasal sinuses (bilateral frontosphenoidectomy) about six months earlier. In addition, the patient had been treated for bronchial asthma and had suffered from hypersensitivity to aspirin and other nonsteroidal anti-inflammatory drugs, hypertension, ischemic heart disease, and was in the course of oral anticoagulation therapy due to permanent atrial fibrillation.

Physical examination revealed inflammatory swelling of left eyelids with accompanying exophthalmus, significant reduction in the eyeball mobility and significant disturbance of the acuity of vision within the left eye. Frontal rhinoscopy revealed bilateral presence of purulent secretion. Otherwise no abnormalities were observed; the body temperature was normal.

Preliminary investigations revealed leukocytosis of $11.69 \times 10^3/\mu\text{L}$, INR of 2.94, and prothrombin time extended to 32.0 sec. The results of the remaining investigations (hemoglobin, platelets) were within normal limits.

Ophthalmological examination on the day of admission revealed questionable perception of light within the left eye with accompanying exophthalmus, downward dislocation of the eyeball with limited mobility in all directions, particularly in the upper direction. Examination of the frontal segment revealed conjunctival congestion on the left and pupil dilation in comparison to the right eye. Fundoscopic examination revealed marked edges of the optic nerve disc and features of venous stasis.

Computed tomography scan revealed the presence of mucocoeles of both frontal sinuses with significant thinning and destruction of bone walls, with protruding inflammatory lesions within the upper/medial orbital segments. In the upper medial of the left orbit a lesion sized $20 \times 30 \times 34$ mm was detected, causing significant compression and dislocation of orbital structures, including compression and forward as well as bottom left displacement of the left eyeball. Optic nerve presented with no signs of compression, separated from the lesion by flattened muscles: the rectus muscle, the superior muscle and the levator palpebrae muscle. (Fig. 1, 2)

Bilateral frontosphenoidectomy with left orbital subpericranial abscess drainage was performed endoscopically. Intravenous antibiotic therapy was applied in the postoperative period: Biodacina (amikacin) 2×500 mg, Metronidazole 3×500 mg, Tartrixson (ceftriaxone) 3×1 g. Antiedemic treatment was administered: Dexaven (dexamethasone sodium phosphate) 2×8 mg, 20% Mannitol 2×100 mL.

In the successive hours after the procedure, the patient reported subjective improvement of the acuity of vision within the left eye. Physical examination revealed improved mobility of the eyeball and partial resolution of the swelling of the orbit.

Follow-up biochemical investigations were performed on day 1 after surgery. The results were suggestive of leukocytosis ($18.5 \times 10^3/\mu\text{L}$), extended APTT of 50.4 sec, PT of 46.7 sec, INR of 4.23. The results of the remaining investigations (platelets, hemoglobin, hepatic and renal function indices) were within the normal ranges. Due to the aforementioned coagulation disorders, the patient was subjected to the transfer of two units of freshly frozen plasma (FFP), which proceeded with no complications. Low-molecular heparin was initiated (Clexane 2×0.4 mL).

On day 2 after surgery, the patient was again consulted by the ophthalmologist due to the increasing exophthalmus of the left eye. Ophthalmological examination revealed exophthalmic position of the left eyeball with limited mobility in all directions, particularly in the upper direction, with the displacement of the eyeball to the bottom and to the side. The pupil of the left eye was normal and correctly responding to light. Significant impairment of left eye vision was observed (the patient was able to count fingers from a distance of 10 cm). Emergency-mode computed tomography scan of paranasal sinuses and orbits was performed on the same day. The scan revealed a spindle-shaped mass located at the superior wall of the left orbit, about $20 \times 30 \times 34$ mm in size, causing significant compression and dislocation of orbital structures, including compression and forward as well as bottom left displacement of the left eyeball. Blood chemistry investigations revealed elongated APTT of 36.2 sec, PT of 20.3 sec, and INR of 1.76.

Due to the worsening local condition and the result of the CT scan, emergency resurgery was performed under general intratracheal anesthesia, consisting in endoscopic revision of paranasal sinuses and left lateral orbitectomy with evacuation of orbital hematoma. One unit of freshly frozen plasma (FFP) was transferred intraoperatively. In the post-operative period, intravenous antibiotic therapy and antiedemic treatment were maintained as before.

On the day after the revision surgery, follow-up computed tomography scan of paranasal sinuses was performed and the patient was consulted by the ophthalmologist. Computed tomography scan of paranasal sinuses revealed the presence of residual soft tissue lesions, sized $9 \times 4 \times 6$ mm, within the anterior superior lateral segment of the left or-

bit. Point-of-care ophthalmological examination revealed questionable perception of light within the left eye. The mobility of the left eye was normal, while the pupillary reaction to light was weaker as compared to the right eye. Fundoscopic examination revealed optic nerve disc at the fundus level and adherent retina within the area available to examination.

On day 6 after surgery, the patient was again consulted by the ophthalmologist who revealed questionable perception of light within the left eye. The eyeball was in normal position and had normal mobility. The diagnostic process of the disturbances of vision within the left eye was expanded by the measurement of visual evoked potentials: no response was obtained from the left eye in pattern VEP measurement while flash VEP (EVEP) afforded an elongated P100 latency (150 msec with normal range of up to 100 msec).

On day 9 after surgery, the patient was discharged home in good overall condition. Recommendations included continued antibiotic therapy: Klabax (clarithromycin) 500 mg 2x1 and antiedemic treatment: Metypred (methylprednisolone) 16 mg 1x1. Visual acuity remained unchanged in follow-up ophthalmological examinations.

DISCUSSION

Transmission of inflammation from paranasal sinuses into the orbit may be associated with the risk of permanent damage to the visual organ (disturbed mobility of the eye, disturbed visual acuity, blindness). Complete loss of vision may be a result of secondary optic nerve inflammation, optic nerve compression, or thrombotic inflammation of the central retinal artery. Bacterial orbital cellulitis may lead to intracranial complications involving permanent neurological deficits or even pose threat to patient's life. The turbulent natural history of orbital complications in the course of paranasal sinusitis qualifies the disorder to the group of emergencies, mainly due to the risk of vision loss [6].

Computed tomography is the primary diagnostic method used for the assessment of this complication. It is a gold standard that facilitates simultaneous assessment of orbits, paranasal sinuses and brain with localization of complication, i.e. preseptal (Chandler type I) of postseptal inflammation (Chandler types II-V) [1]. This is the main criterion when qualifying patients to surgical procedures [9].

Appropriate selected antibiotic therapy is also important. Orbital cellulitis is often caused by mixed, both aerobic and



Fig. 1., 2. Contrast-enhanced computed tomography scan of paranasal sinuses and orbits with inflammation of tissues within the left orbit: left orbit abscess sized 20x30x34 mm causing significant compression and dislocation of orbital structures, including compression and forward as well as bottom left displacement of the left eyeball.

anaerobic, bacterial flora. Thus, empirical treatment should always be targeted against mixed flora and modified according to the antibiogram obtained after swab culture results [2].

Surgical treatment of intraorbital complications in the course of paranasal sinusitis should be limited to patients in whom no clinical improvement is observed after 48 hours of conservative treatment, in case of visual acuity disorders or ophthalmoplegia, as well as patient with intraorbital abscess being visualized in computed tomography scan [8].

Purulent intraorbital complications in the course of paranasal sinusitis are treated surgically from endoscopic and/or external access. For many years, subpericranial abscesses were drained from external access. As endoscopic methods were developed, their use significantly expended beyond the intranasal disorders, facilitating safe procedures being performed within the ocular orbit. With no doubt, the advantages of endoscopic techniques include good cosmetic results and shorter times of hospitalization in surgical departments. Endoscopic surgery facilitates the drainage of an orbital abscess with simultaneous removal of infection focus located within paranasal sinuses using intranasal access.

Complications of endoscopic operative treatment of orbital disorders in the course of paranasal sinusitis are not common. Cases of disturbed ocular mobility leading to doubled vision were reported. Visual acuity disorders are usually associated with the condition of the eye before the initiation of treatment [3]. In the postoperative period, in the case of incomplete abscess drainage, the purulent content may reaccumulate causing the need for revision surgery. Similarly, blood content may accumulate to form intraorbital hematomas which are also an indication for surgical interventions [4].

Orbital hemorrhages may occur at any stage of a surgical procedure. Early hemorrhages may be associated with sudden increase in vascular blood pressure. Even if the vessels appeared to achieve hemostasis during the procedure, local factors that impair coagulation may lead to dissolution of the clot and development of hematoma. This process is most commonly observed on days 4–6 after the surgical procedure; it may also occur as late as one week after surgery [7]. Even the smallest intraorbital hematomas may lead to dramatic consequences such as increased intraorbital pressure compressing the optic

nerve or the blood vessels that supply the blood to retina. In case of increasing intraorbital pressure, the management of choice consists in revision of the surgical field including removal of hematoma. If no drainage was applied before, it should be applied after the revision procedure. Additional help may be offered by appropriate pharmacological treatment such as mannitol or acetazolamide [7].

CONCLUSIONS

The prognoses in orbital complications in the course of paranasal sinusitis are good provided that diagnostic imaging examinations are performed quickly and broad-spectrum antibiotic treatment is initiated followed by targeted antibiotic therapy and surgical intervention, if necessary. These are the crucial elements of the management of every suspicion regarding an inflammation within the orbit.

In the reported case, no functional improvement was observed in the vision organ despite quick surgical intervention which might be due to the period between the onset of first symptoms and the intervention (48 hours) being too long. An additional factor that might be responsible for the lack of vision improvement was the occurrence of complication, namely an orbital hematoma requiring surgical reintervention.

In the reported case, complication of the orbital abscess surgery as manifested by orbital hematoma was probably related to coagulation system being disturbed due to oral anticoagulation treatment. Due to the necessity of emergency surgical intervention it was impossible to prepare the patient to the surgical procedure by earlier withdrawal of oral anticoagulants.

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